

Five-Year Review Report

**First Five-Year Review Report
for the
Hunt's Disposal Landfill Site
Caledonia Township, Wisconsin**

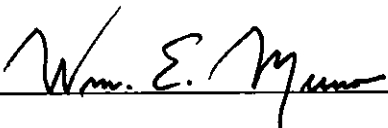
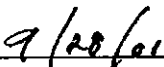
September 2001

Prepared by:

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Date:


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**Hunt's Disposal Landfill Site
Caledonia Township, Wisconsin
First Five-Year Review Report**

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this Five-Year Review report pursuant to CERCLA § 121 and the National Contingency Plan (NCP). CERCLA § 121 states:

"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the Present that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such review."

The Agency interpreted this requirement further in the NCP; 40 CFR § 300.430(f)(4)(ii) states:

"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."

The EPA, Region 5, conducted the five-year review of the remedy implemented at the Hunt's Disposal Landfill site in Caledonia Township, Wisconsin. This report is the first five-year review for the Hunt's Disposal site. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. Background

The Hunt's Disposal Landfill (HDL) was an inactive 35-acre landfill which was part of an 84-acre parcel (including a 25-acre lake) located in southeastern Wisconsin, about 8 miles north of Racine. (See figure 1 for site map.) The site, initially an abandoned sand and gravel pit, began operating as an open dump in 1959. Municipal and industrial wastes were dumped at the site from 1959 to 1974. The parcel is currently owned by the Racine County Parks Department and was originally purchased for inclusion in the Racine County Root River Parkway System. The site borders the Root River in a sparsely populated agricultural area of Caledonia Township in Racine County, within the 100-year flood plain. The river itself is a shallow meandering stream which is about 25 to 40 feet wide and about 3 feet deep much of the year. The site is located immediately south of County Line Road and is approximately 1.5 miles west of Highway 32. The Chicago and North Western (C&NW) Railroad tracks run north-south and are located just west of the site. Approximately 40 homes are located within ½ mile of the site. One mile to the west is a rural community of about 150 homes. The residents around the site rely on private wells for their water supply.

Two aquifers have been found to exist below the landfill, with groundwater flowing in a southwesterly direction towards the river. The upper aquifer, formed out of glacial sand, gravel, and till outwash, is found approximately 25 to 35 feet below ground surface. It is this aquifer that has been contaminated by pollutants found in the landfill and, consequently, subject to on-site treatment described below. The lower aquifer is composed of dolomite (i.e., limestone) bedrock and is approximately 200 feet thick. This lower aquifer is the source of the community's water supply. However, a continuous 15-foot thick clay-till layer, acting as an aquitard or barrier, has been detected between the 2 aquifers beneath the HDL site. The existence of this continuous clay-till layer was an important factor in the design of the selected remedy.

In 1974, the landfill's operating license renewal application was denied and the site, consequently, was to have been closed, pursuant to existing State regulations. The total landfill volume was estimated at 788,000 cubic yards, of which an estimated 620,000 cubic yards was waste-type material. Approximately 168,000 cubic yards of this waste material are below the water table. U.S. EPA conducted a preliminary assessment and site inspection (PA/SI) in 1984. Groundwater, surface water, soil, and river sediments were sampled and analyzed. Results from this preliminary testing revealed that groundwater and soil contamination existed at the site. Inorganic contaminants of concern include arsenic, barium, chromium, manganese, and nickel. Organic contaminants include vinyl chloride, trichloroethene, 1,1-dichloroethane, 1,1-dichloroethene, benzene, naphthalene, and xylene. The source of this contamination was attributed to the landfill, particularly since some of the wastes were located below the water table (upper aquifer) thus, providing a continuing source of groundwater contamination. The highest degree of groundwater contamination was found between the landfill and the Root River and along the southern tip of the landfill. It was determined during the investigation that the contaminated groundwater under the landfill flows into the Root River. Due to the up gradient location of the nearby residential wells, contamination of the drinking water supply from the landfill was not deemed a concern. As far as soil and sediment contamination, the areas of concern were found to be in the southwest edge of the landfill and the Root River, at the southern tip of the landfill, and at the northern edge of the landfill adjacent to the nearby lake. In 1986, based on the results of the PA/SI, the Wisconsin Department of Natural Resources (WDNR) requested that the HDL site be considered for inclusion on the National Priorities List (NPL). U.S. EPA placed the HDL site on the NPL on July 21, 1987.

U.S. EPA completed the Remedial Investigation/Feasibility Study (RI/FS) in July 1990, and the proposed plan outlining U.S. EPA's proposed source control remedy for the landfill was issued on July 26, 1990. A public meeting took place on July 31, 1990. In August 1990, U.S. EPA sent general notice letters to approximately sixty Potentially Responsible Parties (PRPs). The general notice letters informed the PRPs of their potential liability, provided them with copies of U.S. EPA's proposed plan, and invited them to an introductory meeting hosted by the U.S. EPA and WDNR in Milwaukee, Wisconsin. A number of PRPs attended the meeting, where they were given an overview of the results of the RI/FS and proposed remedy for the site. During the meeting, the PRPs were encouraged to organize themselves and to appoint a steering committee (eventually becoming the Hunt's Site Remediation Group).

Subsequent to the closing of the public comment period on the proposed plan, U.S. EPA, with State concurrence, issued a Record of Decision (ROD) on September 29, 1990. The ROD presented the selected remedial action for the HDL site. The principal threats identified at the site, as determined in the risk assessment, were groundwater contamination, contaminated soil, and exposed landfill waste materials. The remedial action addresses the principal known threats at the site by containment of contaminated landfill materials, soils, and groundwater. The function of the remedy is to seal off the HDL site as a source of contamination and reduce the risks associated with exposure to contaminated materials, thereby mitigating the threat to human health and the environment. The major components of the selected remedy include:

- ▶ Installation of a fence around the landfill site;
- ▶ Consolidation of contaminated soil and sediment onto the landfill;
- ▶ Construction of a multi-layer landfill cap over the landfill and consolidated soil and sediment in compliance with RCRA Subtitle D requirements;
- ▶ Construction of a slurry wall down to the low permeability clay-till layer and around the subsurface perimeter of the landfill
- ▶ Construction of a groundwater pump and treat system employing inward gradient control;
- ▶ Construction of an active landfill gas collection and treatment system;
- ▶ Construction of groundwater monitoring wells to verify the protectiveness and effectiveness of the remedy. Monitoring of existing residential wells will be conducted as part of the selected remedy to provide additional verification of the effectiveness of the remedy; and
- ▶ Institutional controls governing groundwater use and development of the landfill site.

Implementation of this selected remedy will reduce and control potential risks to human health posed by exposure to contaminated groundwater, soil, and sediments. Additionally, the remedy is expected to reduce potential human exposure to less than 1×10^{-6} and a hazard index of less than 1. It is also protective of the environment by reducing the potential risks posed by site chemical discharging to groundwater, the Root River, the on-site lake, surrounding soils, sediments, and wetlands.

III. Remedial Actions

The Remedial Design/Remedial Action (RD/RA) phase of this project was conducted by the PRPs in accordance with the Consent Decree (Civil Action 92-C-433) entered into by the U.S. EPA and the PRPs on April 21, 1992. The final (100%) RD report was submitted to U.S. EPA in December 1995. Conditional approval of the final RD report was given by U. S. EPA on June 17, 1996. The few remaining issues to be resolved were addressed by the PRP on June 27, 1996. The construction activities were done in two phases. The 95% Remedial Design for the slurry wall was approved for construction by U.S. EPA in July 1995. RA activities began on September 18, 1995. Construction of the slurry wall was completed in November 1995. U.S. EPA conducted oversight of the PRP RD/RA construction management activities at the site with the assistance of the U.S. Army Corps of Engineers, via an Inter-Agency Agreement. All design plans and field activities were reviewed and approved by U.S. EPA, in consultation with WDNR, to ensure consistency with the ROD, the RD and RA work plans, the SOW, and Federal and State requirements. The design strategy for the site was based on achieving the following objectives:

- ▶ Reduce the amount of infiltration of surface water into and through the waste mass to control the generation of impacted water by the installation of a low permeability landfill cover system (RCRA cap);
- ▶ Control the potential for groundwater to migrate through the HDL site to off-site areas by installation of a slurry wall;
- ▶ Extract and treat groundwater from the upper aquifer beneath the HDL site to

- ▶ prevent migration of contaminants off-site by maintaining an inward gradient;
- ▶ Manage the potential for landfill gas concentrations to build up under the landfill cap or migrate from the site by installing a landfill gas management system;
- ▶ Implement institutional controls (i.e., deed and access restrictions) at the site.

Slurry Wall: The slurry wall was constructed along and slightly outside the perimeter of the landfill, except for a section adjacent to the Root River where there is an opening. The trench was excavated as a single unit to avoid seams and joints within the wall. The slurry mix consisted of natural Wyoming-type bentonite clay and water. The opening in the slurry wall will allow impacted groundwater between the landfill and Root River to be pulled into the site's interior groundwater extraction system. The purpose of allowing water to flow through the slurry wall opening is to allow for the flushing of contaminants out of the soil along the banks of the Root River and into the groundwater which, in turn, will be extracted and treated in the groundwater treatment system. The wall is approximately 4,000 feet long and 30-48 feet deep. THE HDL SOW requires a hydraulic permeability of 1×10^{-7} cm/sec or less. The pre-final horizontal alignment of the slurry wall was selected based on the limits of the waste established by test pit excavation and reported in the pre-design report. The alignment of the wall was designed to be at least 6 feet outside the defined limits of waste. Vertically, the wall was constructed to be plum and penetrate a minimum of three feet into the lower clayey-till unit. Visual confirmation by a geotechnical engineer during slurry wall trenching activities documented that the excavation had indeed penetrated into the required depth of clayey-till unit. Slurry wall width is at least 2 feet, conforming to the calculated maximum hydraulic gradient requirement. Performance monitoring of the slurry wall is performed at 4 locations (3 pairs of piezometers and one piezometer/monitoring set) installed inside and outside of the completed wall. Water levels are measured at each location to verify that an inward hydraulic gradient has been established across the wall.

Groundwater extraction and treatment system: The installed pump and treat system included the 5 groundwater extraction wells with submersible pumps, transfer piping, flow equalization tank, and an air stripping unit. A brief description of each subsystem is provided below. The design of the system includes maintaining a specified inward gradient (1 foot minimum) across the slurry wall.

Extraction Wells: The number, locations, and extraction rates for the wells installed were based on the MODFLOW groundwater flow modeling software. The model indicated an optimum number of 5 wells, pumping at 3 gallons per minute at each well, will maintain a 1-foot inward gradient across the slurry wall. The 6-inch diameter (casing) wells are buried to a depth ranging from 40 to 65 feet and are screened from above the static groundwater level of the upper aquifer down to the top of the clay-till layer. The well screens are constructed of stainless steel.

Transfer piping: The transfer piping conveys the extracted groundwater to the on-site groundwater treatment system. The pipes were buried under the compacted clay layer and within the 6-inch grading layer of the landfill cover, thereby protecting it from freezing. Groundwater is conveyed under pressure in the piping (i.e., force mains) to the treatment building.

Flow Equalization Tank: Sized at approximately 1,500 gallons and primarily constructed of polyethylene. The tank is located inside the groundwater treatment building and was designed to be self-supporting and be able to withstand hydrostatic water pressure plus a safety factor of 1.3.

Air Stripper: Removal of volatile organic compounds (VOCs) in the groundwater was the basis for choosing an air stripper as the primary treatment unit. Groundwater enters the top of the stripper and flows across each sieve tray toward the bottom of the unit. The air passes upwards through openings in the trays, then bubbles through the water to form a "surface of foam", provides turbulence and volatilization. The system has a design

capacity of 40 gallons per minute and is designed to operate continuously year-round.

Landfill Gas Management System: The landfill gas management system (LFG) consists of five horizontal gas collection trenches, a collection header, blower, flare, and valves. Operation of the system consists of running the blower which results in a vacuum effect that draws landfill gas through the collection trenches and header to the blower. The blower then send the gas to the flare unit where the gas is combusted. Valves at each of the horizontal gas collection risers and at the blower, control the gas flow to maintain methane and oxygen content within prescribed ranges. The LFG system was designed and constructed to operate in either a passive or active (i.e., flaring) mode, depending on whether the emissions can comply with WDNR air regulations.

Landfill Cap: Design criteria for the final cover was based on material properties and grade requirements of the State. The design included a 6-inch grading layer, 2 feet of compacted clay, 18 inches of protective soil cover; and 6 inches of topsoil. Spoils from the slurry trench and gas collection trenches were reconsolidated onto the landfill. The 2-foot compacted clay layer has a maximum hydraulic conductivity of 1×10^{-7} cm/sec and a minimum of 50% by weight passing the 200 sieve (0.074 mm). A service road was constructed on the final cover to allow service vehicle access for operation and maintenance. Surface water control at the site was incorporated into the final cap design. Permanent erosion control placed along the Root River consists of riprap and vegetation. A levee was not constructed since the elevation of the landfill was determined to be above the 100-year flood stage.

Institutional controls: Administrative control actions in place include deed restrictions on future use of the HDL site (i.e., potable well installation, site development). Personnel with authorized access to the site will be required to know and understand site specific health and safety concerns associated with the site.

Perimeter fencing around the landfill has been installed at an elevation above the 100-year flood elevation. The on-site lake and the adjacent Root River have previously been deemed not to present a risk to human health or the environment. Fencing consists of a 6-foot high chain link fence with 3 strands of barbed wire. Supporting posts were placed at 10-foot intervals. A locking gate is installed at the access road entrance. Additional fencing has been installed around the blower flare and groundwater treatment areas, located with the perimeter fencing, to discourage entry by unauthorized personnel and prevent vandalism. Warning signs are placed along the perimeter fence and on the locking gate.

IV. Operation and Maintenance Activities

The following monitoring program has been implemented during the operation and maintenance phase of this project:

- ▶ **Long-Term Groundwater Monitoring:** This groundwater monitoring program includes wells located inside and outside of the slurry wall. Groundwater samples are collected quarterly and analyzed for TCL Volatile Organic Compounds, Aluminum, Arsenic, Barium, Chromium, Manganese, Nickel, Chloride, Sulfate, and Alkalinity.
- ▶ **Slurry Wall Monitoring:** Water levels in select monitoring wells and piezometers around the site are used to measure the hydraulic gradient across the slurry wall. Four pairs of wells are located across the slurry wall to measure the effectiveness of the groundwater extraction system in maintaining an inward gradient.
- ▶ **Groundwater Extraction and Treatment System Monitoring:** The primary parameters to be monitored include the total volume of groundwater pumped, treated, and discharged to the Root River, and the influent/effluent quality of the water. Effluent limits were provided by the WDNR.
- ▶ **Landfill Gas Extraction System Monitoring:** Landfill gas monitoring is performed consisting of methane and oxygen content.

The groundwater extraction, treatment, and monitoring will be required until it has been demonstrated that

groundwater cleanup levels have been attained. The SOW contained in the Consent Decree requires the PRP to demonstrate that the groundwater is at or below the prescribed cleanup levels for sixty consecutive months before it can cease operation of all or part of the groundwater monitoring program. This demonstration must be submitted to U.S. EPA, in a petition form, for approval before groundwater monitoring can cease.

V. Applicable or Relevant and Appropriate Requirements (ARARs) Review

With respect to any hazardous substances, pollutants, or contaminants that will remain on-site, CERCLA (Section 121(2)(A)) requires the U.S. EPA to select a remedial action which complies with legally applicable or relevant and appropriate standards, requirements, criteria or limitations (ARARs). Continued operation of the RA will ensure that ARARs will be met at the site. With respect to groundwater, Maximum Contaminant Levels (MCLs) and to a certain extent, Maximum Contaminant Level Goals (MCLGs), the Federal drinking water standards promulgated under the Safe Drinking Water Act (SDWA), are ARARs for the site. MCLGs are relevant and appropriate when the standard is set a level greater than zero (noncarcinogens), otherwise MCLs are relevant and appropriate. At the Hunt's Disposal site, MCLs and MCLGs are not applicable, but are relevant and appropriate, since the groundwater in the upper aquifer could potentially be used as a drinking water supply.

The State of Wisconsin is authorized to administer the implementation of the Federal SDWA. The State has also promulgated groundwater quality standards. The statute directs the Wisconsin Department of Natural Resources to take action to prevent the continual release of contaminants at levels exceeding standards at the point of standards application. The Wisconsin Groundwater Quality Standards are generally equivalent or more stringent than corresponding Federal standards and, therefore, are ARARs to groundwater cleanup conducted at the site. Consistent with the State's exemption criteria, a Wisconsin alternative concentration limit (WACL) may be established to modify the preventive action limit (PAL) if it is determined that it is not technically and economically feasible to achieve the PAL for a specific substance. Except where the background concentration of a compound exceeds the enforcement standard (ES) and consistent with the criteria in Section NR 140.28(4)(B), the WACL that is established may not exceed the ES for that compound.

The implementation of the selected remedy at the Hunt's site will be in compliance with Ch. NR 140, WAC, in that preventative action limits (PALs) will be met unless (Wisconsin) alternative concentration limits (WACLs) are established pursuant to the criteria in Section NR 140.28, WAC, in which case the WACLs will be met.

The ROD indicate that a determination of technical or economic infeasibility may be made after five years of operation of the groundwater extraction system if it becomes apparent that the contaminant level has ceased to decline over time and is remaining constant at a statistically significant level above the PAL (or any WACL established due to high background concentrations) in a discrete portion of the area of attainment, as verified by multiple monitoring wells. This should be performed within the next year, which will be five years after startup and operation of the groundwater extraction system. Until such time, it is expected that the current state standards should be met.

VI. Five-Year Review Findings

A comprehensive review of all the Quarterly Reports for the site was performed in the preparation of this report. The following assessment has been made:

Slurry Wall: The partial slurry wall has been in place since November 1995. The Final Operations and Maintenance Plan for the RA indicates that a soil-bentonite slurry will be added to any section of the slurry wall that has receded or settled more than 3 feet during the O&M period. Since there has been no evidence of slurry wall failure, or minor settling/receding, the slurry wall system has required no

maintenance or repairs since installation.

Landfill Cover System: The landfill cover has been in place since November 1996. Vegetative planting of the landfill cover has yielded a dense, healthy vegetative growth. The cover is well protected by this vegetation, including portions of the site along the banks along the Root River. During the course of O&M, an incident of a small grass fire and minor erosion situations have occurred as a result of severe weather conditions, however these situations have been addressed and no lasting damage to the landfill cover has resulted.

There are no indications of air migration through the cover system, and there is no evidence of disturbance to the cap. Then landfill has continued to produce flammable landfill gas with low oxygen levels. Fluctuations in water levels in monitoring wells located within the slurry wall are lower than those outside the slurry wall, indicating that the landfill cover and slurry wall continue to operate as designed.

Landfill Gas Extraction System: The landfill gas extraction system consists of five horizontal gas collection trenches, a collection header, blower, flare, and valves. Startup of the system occurred on July 14, 1997. Operations of the system consists of running the blower, which causes a vacuum effect that draws landfill gas through the collection trenches and header to the blower. The blower then sends the gas to the flare unit, where the gas is combusted. Valves at each of the horizontal gas collection risers and at the blower control the gas flow to maintain methane and oxygen content within prescribed ranges. Through the course of O&M activities, only minor maintenance work has been required. During the course of repairs, the landfill gas system was passively vented to relieve internal gas pressures. Other activities performed on the landfill gas system include monthly readings of landfill gas characteristics (methane and oxygen content).

Overall, the landfill gas collection system appears to be operating satisfactorily. The system has not depleted the landfill gas in the vicinity of horizontal gas collection trenches No. 2 and No. 3 entirely, but the waste in these areas of the landfill do not generate landfill gas in amounts sufficient to maintain combustibility levels in the volume of air flow induced by the blower. The riser No. 3 valve has been closed since December, 1997 and the riser No. 2 valve has been closed since June 1998. Flammable gas continues to be withdrawn from gas collection trenches 1, 4, and 5.

Groundwater Extraction and Treatment System: Startup of the groundwater extraction system took place on August 4, 1997. The groundwater extraction and treatment system consists of five extraction wells and pumps, vault structures, equalization tank, filters, air stripper, blower, pumps, outfall structure, system piping and electronic control system. Overall, the groundwater treatment system appears to be functioning effectively. Historically, there have been no problems with the extraction wells or vaults, however, extraction well E-5 continues to yield a low volume of water relative to other wells in the system. This low yield is believed to be the result of the variable thickness of the aquifer underlying the landfill. In the vicinity of extraction well E-5, the aquifer, which is composed of saturated, permeable outwash material, is relatively thin (approximately one foot). An inward gradient has not been established at monitoring location P4BR/MW11D which is located on the southwest side of the landfill. MW11D is located 20 feet from the banks of the Root River, just outside the slurry wall at this location. Water quality at this location has been monitored throughout the O&M phase. No impacts to water quality have been experienced at this location. However, an evaluation as to the efficacy of E-5 to establish a sufficient inward gradient should be pursued.

In addition, the inward gradient head difference at location PA1/PB1 should be monitored to ensure that the established 1 foot head difference is achieved at that location.

Four of the five extraction well pumps and the equalization tank have operated without problem during the O&M activities. There have been problems with the flow meter for extraction well E-2. This is evidenced by the discrepancy between the E-2 flow totals recorded by the meter for the quarters and the well pump running times. Diagnostic tests were performed on the electronic flow metering element at extraction well

E-2, and it was determined that the flow measuring device was faulty. A replacement flow measuring element has been installed.

Minor repairs have been performed on the equalization tank during the course of O&M activities and it has been operating satisfactorily.

The filter bags (in-line just prior to the air stripper) are changed regularly as part of the ongoing O&M activities. The purpose of the filter bags is to remove solids from the water prior to introduction into the air stripper. The filter bags are removed on a monthly basis and the spent bags are placed in the same drum as the precipitated material from the air stripper trays.

The air stripper unit functions by blowing air through a series of small-diameter holes in the tray floors, into a thin layer of flowing water, thus volatilizing contaminants. However, this aeration of the groundwater also tends to cause oxidation of dissolved iron and other metals in the water, and encourage bacterial growth. This results in a buildup of scale, rust, and sludge on the air stripper trays. As the buildup of material on the air stripper trays increases, the diameter of the holes in the trays decreases, and the aeration capabilities decrease. The air stripper trays are cleaned monthly to prevent excessive buildup of scale, precipitate, and sludge. The air stripper trays are cleaned by removing and immediately scraping away wet sediment buildup on the floors of the trays, and pushing through each small diameter hole in the floor to expel sediment buildup in the hole. On one occasion in 1999, a malfunction in the air stripper caused a shutdown of the extraction and treatment system. On August 20, 1999, the float switch that detects high water levels in the effluent sump of the air stripper malfunctioned, setting off an internal alarm that shutdown the extraction and treatment system. The original cause of the malfunction is unknown. The groundwater extraction and treatment system was disabled until August 30, 1999, when a replacement float switch was obtained from the air stripper equipment vendor and installed.

The outfall structure for the groundwater treatment system starts with a 2-inch discharge pipe exiting the air stripper sump. The 2-inch HDPE pipe is routed on top of the treatment building concrete floor to a discharge pipe in the floor. The discharged water flows through the floor drain to a 4-inch HDPE pipe which flows underground to the outfall near the Root River. With the exception of minor O&M, the structure continues to operate as designed.

The electronic control system for the groundwater and gas collection and treatment systems have been performing adequately, with minor repairs through the course of O&M activities. Power outages were experienced at the site from June 16 to June 21, 2000. This resulted in a temporary shut down at the site, due to problems with the electronics at the site. Repairs were completed on August 16, 2000. These repairs consisted of replacement of an electronic module in the electrical panel at extraction E-1. The flow measuring element for extraction well E-2 has also experienced some problems.

The groundwater treatment system appears to be functioning effectively. All effluent limits have been adequately met by the treatment system. Water levels in select monitoring wells and piezometers around the site are used to measure the hydraulic gradient across the slurry wall.

Groundwater monitoring is performed on a quarterly basis in accordance with the site specific Quality Assurance Project Plan (QAPP) and Operation and Maintenance Plan. Subsequent to the 1990 ROD, additional, additional groundwater studies were performed to assist in the development of the long term monitoring program. The results of these findings are summarized in the Groundwater Extent of Contamination Investigation Technical Memorandum (April, 1993). Historically, results of monitoring have yielded relatively consist results. An exception has been identified with respect to monitoring at MW 10S. In particular, vinyl chloride concentrations have been identified as a concern. During the 11th quarterly sampling event, concentrations were noted to be reducing from previous monitoring events. However, during the 12th & 13th monitoring events concentrations significantly increased. This may have resulted following the temporary shutdown of the groundwater treatment system, discussed above. Concentrations were reducing at the time of the 14th monitoring events and EPA is awaiting results of sampling performed

during the 15th monitoring event. This observation has been discussed with the Hunt's Site Remediation Group and O&M contractors. Based upon recent analysis, an evaluation will be performed by EPA and WDNR as to whether additional action should be taken.

Institutional Controls: On August 19, 1992, a Declaration of Restrictions On Use of Real Property was executed at the site. The following restrictions apply to the Hunt's Disposal Landfill property:

- ▶ There shall be no consumptive or other use of the groundwater underlying the property;
- ▶ There shall be no use of, or activity at, the property that may interfere with the work performed or to be performed under the Consent Decree at the property, or any activity which may damage any remedial action component contracted for or installed pursuant to the Consent Decree or otherwise impair the effectiveness of any work to be performed pursuant to the Consent Decree;
- ▶ There shall be no installation, construction, removal or use of any building, wells, pipes, roads, ditches or any other structures at the property except as approved by the U.S. EPA as consistent with the Consent Decree; and
- ▶ There shall be no residential use of the property.

These property controls are appropriate and adequate for the Hunt's Disposal site.

VII. Site Inspection

A site inspection was conducted on August 1, 2001, by EPA, WDNR, and representatives from the Hunt's Site Remediation Group and their O&M contractor. The purpose of the inspection was to assess the protectiveness of the remedy, including the presence of fencing to restrict access, the integrity of the landfill cap and other remedial components at the site.

No significant issues have been identified with respect to the landfill cover that has been in place since November 1996. Examination of the cap revealed that there was minor erosion near the location of Extraction Well #2. This was noted and will be repaired by the O&M contractor.

VIII. Recommendations

This five year review has summarized the remedial activities and current O&M activities at the site. The following actions are recommended for continued O&M and optimization of the implemented remedy:

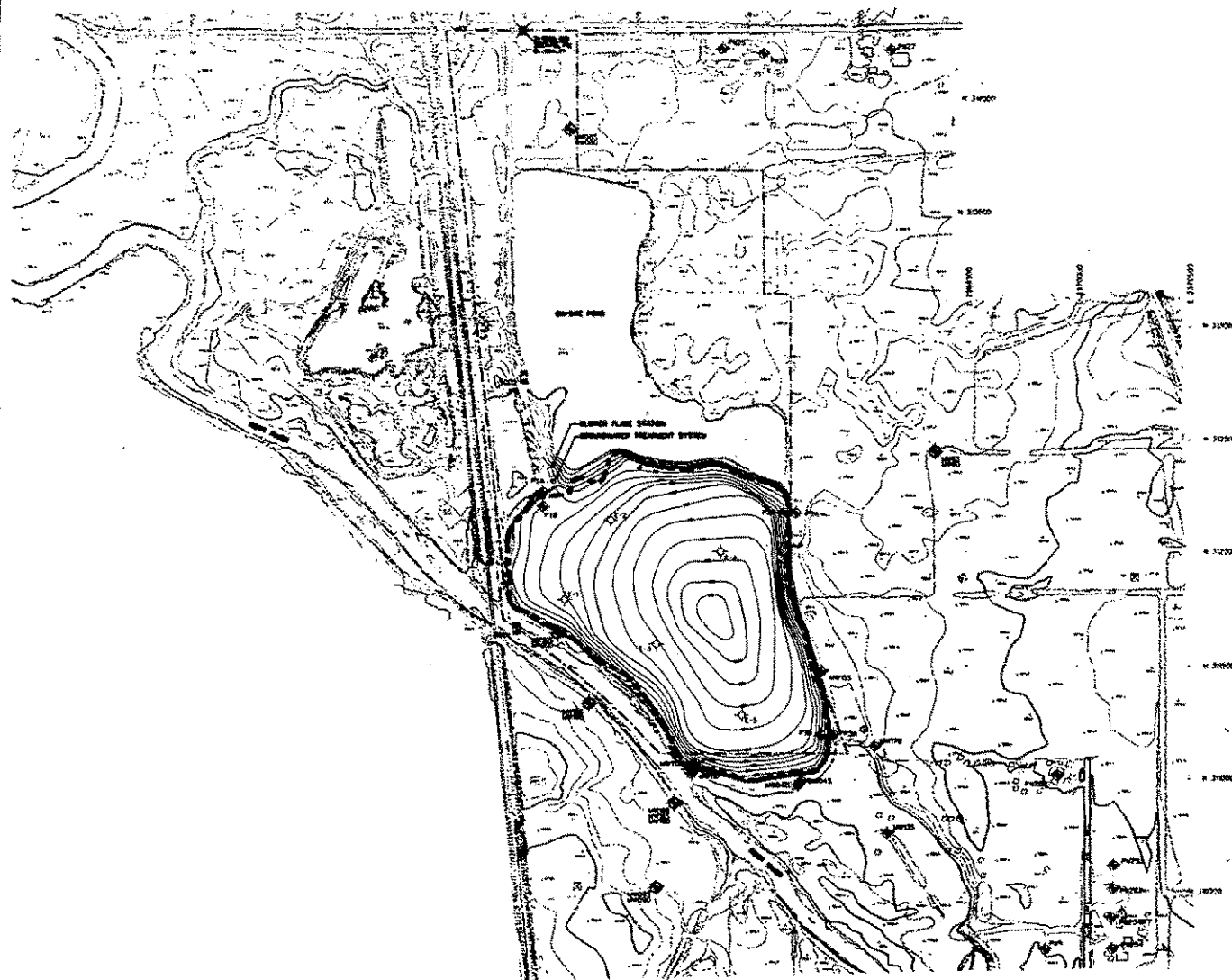
- ▶ An adequate inward gradient has not been established at monitoring location P4BR/MW11D which is located on the southwest side of the landfill. MW11D is located 20 feet from the banks of the Root River, just outside the slurry wall at this location. An evaluation as to the efficacy of E-5 to establish a sufficient inward gradient should be pursued. This should include an evaluation of eliminating the opening of the slurry wall, thus completely encircling the landfill.
- ▶ The inward gradient head difference at location PA1/PB1 should be monitored to ensure that the established 1 foot head difference is achieved at that location.
- ▶ Monitor the groundwater results obtained during the next round of quarterly sampling at MW 10S to evaluate VOC concentrations at that location to determine if additional action is warranted.

IX. Statement of Protectiveness

Hazardous substances, pollutants, or contaminants remain at the Hunt's Disposal Landfill Site which require continued O&M of the RA, as well as access controls. All exposure pathways that could result in unacceptable risks are being controlled through the implemented RA. The remedy continues to operate and is protective of human health and the environment. Long-term protectiveness of the remedial action will be verified by continued monitoring of the landfill gases and groundwater conditions at the site.

X. Next Five-Year Review

The next five-year review for the Hunt's Disposal Landfill Site is required by September 2006, five years from the date of this review.



EARTH  TECH

HUNT'S DISPOSAL LANDFILL
MARCH 2001 TOWN OF CALEDONIA, WISCONSIN 430255